Math League News

■ Use the Internet to View Scores or Send Comments to comments@mathleague.com.

■ Contest Registration and Books of Past Contests Register for next year by mail or on the internet right now! Renew now so you don't forget later! *You may ask us to bill you this fall.* We sponsor an *Algebra Course I Contest* and contests for grades 4, 5, 6, 7, and 8. Use the registration form enclosed with Contest #6 to register for contests or to **Order Books of Past Contests**.

■ 2026-2027 Contest Dates We schedule the six contests to be held four weeks apart (mostly) and to end in March. Next year's contest (and alternate) dates, all Tuesdays, are October 20 (Oct. 27), November 17 (Nov. 25), December 15 (Dec. 22), January 12 (Jan. 19), February 9 (Feb. 16), and March 16 (Mar. 23). Have a testing or other conflict? Now is a good time to put an alternate date on your calendar!

■ Test Security Procedures Students are expected to sign the honor pledge posted on our website, affirming that they "will neither give nor receive help with any of the Math League Contest questions either before or during any of the Math League Contests." Of course, in the end contest security is really a cooperative effort. Schools should do whatever they can to prevent premature disclosure of questions and/or answers. For our part, we are always monitoring the results for any suspicious outcomes, which we then investigate thoroughly.

■ End-of-Year Awards and Certificates Symbols identify winners. We ship plaques to the advisors. Errors? Email dan@mathleague.com. Identify the award, contest level, your name, and the school's name and address. The envelope for Contest #5 contained Certificates of Merit for the highest scoring students overall and in each grade for the year. Do you need extra certificates for ties? Email dan@mathleague.com and you will be provided with a link to a printable color pdf of our Certificate of Merit.

■ General Comments About the Contest (and the Year) Richard Newcomb said, "Thanks for another great year of problems." Robert Morewood said, "Thanks for another year of stimulating questions!" Denes Jakob said, "Thank you for the interesting and challenging math problems. They have generated some great math discussions with my contestants." Erik Berkowitz said, "I liked this contest — some fun questions that didn't even involve a calculator (although some students tried!)."

■ Question 6-1: Comment Robert Morewood said, "All of our students can do partitions, but too few know the Triangle Inequality! However, after the contest I overheard those who did explaining it to others. It's great when a contest question stimulates the spread of knowledge!"

■ Question 6-2: Comment Robert Morewood said, "I got an appeal from [3 students], all of whom counted 4 UNORDERED triples. (You might consider putting 'ordered' triples is subsequent publications.)"

Statistics / Contest #6

Prob #, % Correct (*all reported scores*)

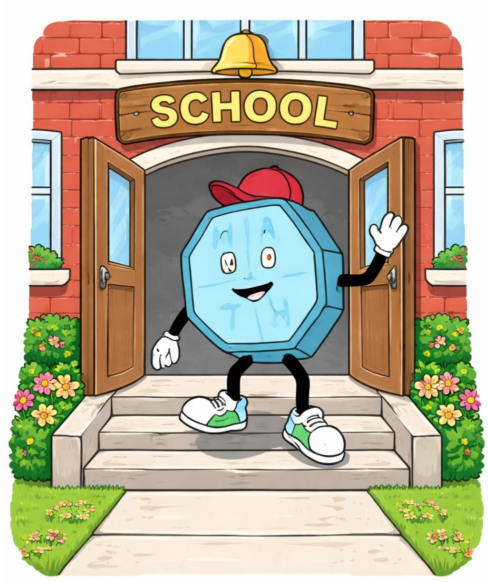
6-1	57%	6-4	40%
6-2	47%	6-5	22%
6-3	72%	6-6	26%

■ Question 6-3: Comments Several advisers pointed out that there was a bit of a time anomaly in the facts stated for Question 6-3. A quick calculation reveals that the youngest bear won't be born until 2028; that is a bit of a paradox since the question is written in the past tense. Erik Berkowitz, Peter Knapp, and Robert Morewood were among the sharp-eyed advisers (or advisers to sharp-eyed students) who point out this issue. As Robert said, "Many students noticed that there seems to be a time-traveler involved in this question. The seventh little bear was born in the year 2028! Or perhaps the Bears use a Buddhist-Era calendar?"

■ Question 6-4: Comment and Alternate Solution Robert Morewood said, "Alternate idea: Some students, noticing that 2026! was much too large to compute on their calculators, tried replacing all occurrences of 2026 with 2, then 3, then 4 ... leading to the conjecture that the answer is '1'. (I later found a calculator which would accept the original expression - in summation notation - but it suffered from some kind of round-off error, giving the answer zero.)"

■ Question 6-5: Comments and Alternate Solutions Denes Jakob, Joshua Ruark, and Robert Morewood all proposed alternate solutions using a vector approach. Joshua Ruark said, "Taking any two diagonals as a vector (orienting the cube in the first octant with length 1 sides), the cosine of the angle between the vectors is the absolute value of the dot product of the two vectors divided by the product of the vector lengths. For example, two such vectors are <1,1,1> and <1,-1,1>. The dot product of the two vectors is 1, while the length of each is √3. √3 times √3 is 3, making the cosine 1/3." Robert Morewood also had another alternate solution, saying "That combination of 3-D visualization and trigonometry defeated all of our students! If one can handle the 3-D visualization, drop a perpendicular from that intersection point to the edge between those diagonals to get the cosine of the half angle, √(2)/√(3). Then compute Cos(2(Cos⁻¹(√[2/3])). Easily done on a calculator or, for more advanced students, with the double angle identity."

■ Question 6-6: Comment Robert Morewood said, "An interesting equal area result! It is related to the more well-known result that any point inside a parallelogram (formed by joining the midpoints of your quadrilateral) when joined to the corners (those midpoints), forms pairs of triangles with equal area sums."



SEE YOU NEXT YEAR!!